

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

MANURE TRANSFER

(no.)
CODE 634

DEFINITION

A manure conveyance system using structures, conduits, or equipment.

PURPOSE

To transfer animal manure (bedding material, spilled feed, process and wash water, and other residues associated with animal production may be included) through a hopper or reception pit, a pump (if applicable), and a conduit to:

- a manure storage/treatment facility,
- a loading area, and
- to agricultural land for final utilization. This includes application of manure to the utilization area.

CONDITIONS WHERE PRACTICE APPLIES

The manure transfer component is a part of a planned agricultural manure management system.

Where manure is generated by livestock production or processing; and a conveyance system is necessary to transfer manure from the source to a storage/treatment facility and/or a loading area, and/or from storage/treatment to an area for utilization.

CRITERIA

Criteria for All Purposes

Manure transfer components shall comply with all federal, state, and local laws, rules and regulations.

Structures

All structures, including those which provide a work area around pumps, will be designed to withstand the anticipated static and dynamic loading. The structure shall withstand earth and hydrostatic loading in accordance with Practice Standard 313, **Waste Storage Facility**. The minimum thickness of component elements of concrete structures shall also be in accordance with Practice Standard 313. When needed, covers shall be designed to support the anticipated dead and live loads.

Reception pits shall be sized to contain one full days manure production.

Openings to structures to receive manure from alley scrape collection shall be a minimum of 9 square feet with one dimension no smaller than 4 feet. The opening shall be equipped with a grate designed to support the anticipated loads.

When curbs are needed in conjunction with structures, they shall be constructed of either concrete or wood. Curbs shall be of sufficient height to insure total manure flow into the structure and be adequately anchored.

Pipelines

Design of pipelines shall be in accordance with Practice Standard 430, **Irrigation Water Conveyance, Pipeline**. The minimum pipeline capacity from collection facilities to storage/treatment facilities shall be the maximum flow anticipated on a daily basis. The minimum pipeline capacity from storage/treatment facilities to utilization areas shall insure the storage/treatment facilities can be emptied within the time limits stated in the management plan for manure utilization.

Pipelines shall be designed to have a minimum velocity of 2 feet per second and a maximum velocity of 6 feet per second. Velocities can be reduced if a minimum of 5 feet of head is provided on the pipe system where ruminant manure is transferred in a gravity system.

Clean-out access shall be provided for gravity pipelines at a maximum interval of 200 feet for lines carrying non-bedded manure. For pipelines carrying bedded manure the maximum interval shall be 150 feet. Gravity pipelines shall not have horizontal curves or bends except minor deflections (less than 10 degrees) in the pipe joints unless special design considerations are used.

Other Conduits

Concrete lined ditches shall be designed in accordance with National Practice Standard 428A, **Irrigation Water Conveyance, Ditch and Canal Lining, Non-reinforced Concrete**. A minimum design velocity of 1.5 feet per second shall be used.

Pumps

Pumps installed for manure transfer shall meet the requirements of Practice Standard 533, **Pumping Plant for Water Control**. Pumps shall be sized to transfer manure at required system head and volume. Type of pump shall be based on the consistency of

manure. Consideration for pump installations shall be based on manufacturer's recommendations.

Safety

The system design shall consider the safety of humans and animals during construction and operation.

Open structures shall be provided with covers or barriers such as gates, fences, etc. Ventilation and warning signs shall be provided for manure transfer systems as necessary to warn of the danger of entry and to reduce the risk of explosion, poisoning, or asphyxiation.

Pipelines from enclosed buildings shall be provided with a water-sealed trap and vent or similar devices where necessary to control gas entry into buildings.

Gravity discharge pipes used for emptying a storage/treatment facility shall have a minimum of two gates or valves, one of which shall be manually operated.

Tractors or other vehicles used to tow manure spreaders or tank wagons shall be sized to reduce the danger of roll-over.

Criteria for Land Application

Manure shall be applied to the utilization area in amounts and at a time consistent with the manure management plan and Practice Standard 633, **Waste Utilization**.

Sprinklers or sprinkler systems shall be designed in accordance with Practice Standard 442, **Irrigation System, Sprinkler**. Sprinkler system design capacity shall be adequate to apply the required volume of manure at a rate and uniformity that shall prevent runoff and meet the nutrient needs of the plants. Nozzle size shall be appropriate for the consistency of the manure applied. Sprinkler applied, manure contaminated water, shall normally contain less than two percent solids unless

provisions are made for straining or filtering before application.

Manure spreaders and/or tank wagons shall have adequate capacity to insure the emptying of storage/treatment facilities within appropriate time periods as stated in the system operation and maintenance plan.

Gated pipe and other appurtenances used in conjunction with gravity application shall be designed to insure uniform application amounts.

Waste effluent application methods shall not create ponding or runoff that exceeds the application site boundary. Spray application shall be isolated 500 feet away from residences, public areas, or roads.

Wastewater application should be performed at times of minimal wind conditions to minimize the effects of odor.

The transfer of manure to second party recipients must be approved by the State Department of Health.

CONSIDERATIONS

Utilization of topography to generate head to reduce pumping requirements;

Economics (including design life), overall manure management system plans, and health and safety factors;

Possible contamination of domestic water systems and ground water;

Loading and unloading of equipment in the vicinity of the manure transfer components;

Subsurface conditions, i.e., depth to bedrock, water table, etc.;

When applicable, compatibility to joint use of manure transfer with irrigation system design requirements;

System for flushing pipelines with clean water;

Provisions for cleaning out solids deposition in ditches;

Pipe pressure rating adjustments required based on manure temperature.

Corrosion resistance and water tightness in the selection of pipe material and joints;

Need for appropriate check valves, anti-siphon protection and open air breaks;

Sanitation needs of all conveyance equipment that leaves the farm in order to prevent the spread of disease;

Potential for salt (struvite) deposits in smaller diameter pipe.

PLANS AND SPECIFICATIONS

Plans and specifications for installing manure transfer systems shall be in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Quantities of materials required such as volume of concrete, steel reinforcement, pipes, etc. will be included with the plan.

The plans shall specify the type and specifications of equipment needed to transfer the manure. Pumps shall have the volume and pressure requirements listed. List the capacity for tanks and wagons.

Structures

Plans for structures shall include the location, capacity, dimensions, material requirements, structural details, and foundation requirements. Construction drawings shall show sufficient detail so that the structures will be constructed as designed.

The Hawaii Manure Transfer Specification shall be furnished to the client as a construction specification.

Plans for the manure transfer will be incorporated into the waste management plan.

OPERATION AND MAINTENANCE

Operation and maintenance shall be in accordance with the requirements specified

in the overall operation and maintenance plan required by the applicable Practice Standard 313, **Waste Storage Facility**, or 359, **Waste Treatment Lagoon**.

The Operation and Maintenance Guide for Manure Transfer will be included with the construction plans.